

Visual Uniformity Test Procedures

Kodak

October 2008 • T12605

INTRODUCTION

Reasons to Perform Uniformity Test

Uniformity testing is necessary when:

- Projection and/or telecine visual inspection of images indicates there may be an unacceptable severity level of non-uniformity (color or density variations) on the origination or KODAK VISION Color Intermediate Film (VCI) footage.
- A chemical or mechanical change (or adjustment) has been made within the developer tank, the developer turbulation system, or the bleach and/or fix solutions.

Tools Required

KODAK Uniformity Test Kit / for 65 mm ECN-2 Origination Process	Cat No. 849 4429
KODAK Uniformity Test Kit / for 35 mm ECN-2 Intermediate Process	Cat No. 846 1139
KODAK Uniformity Test Kit / for 35 mm ECN-2 Origination Process	Cat No. 832 2679

Uniformity Test Procedure

1. Receive Uniformity Test Kit (precision-flashed test footage, processed check film, documentation describing uniformity imperfections and severity ratings).
2. Before making any mechanical, chemical or design changes to equipment, run ONE precision-flashed test unit through the processing machine.
3. View the processed uniformity test footage using telecine equipment. Telecine should be adjusted according to Telecine Analysis Film (TAF) setup protocol.
4. Printing and projecting the tested footage is another acceptable method for uniformity evaluation. If printed footage is desired, print the origination or intermediate test footage to a neutral density onto KODAK VISION Color Print Film (VCP) (approximately 1.0 density, RGB).
5. Use the specific image descriptors to accurately compare the visual uniformity of the test footage.

Note: HELPFUL HINT—Use the uniformity imperfection definitions, and uniformity definitions provided in this document.

6. Determine the specific type and severity of the non-uniformity present on the processed test footage.
7. Decide whether adjustments to the processor are necessary (or desired) based on the test's result.
8. Make necessary changes or adjustments to the processing machine (development tank, developer turbulation system, the processing solutions).

Note: HELPFUL HINT—Utilize processing guidelines available in KODAK Publication No. H-24, "Processing KODAK Motion Picture Films."

9. If adjustments were required, perform the desired adjustments, then rerun another precision-flashed test strip once satisfied the processing machine has been brought back to Kodak's H-24 Manual suggested guidelines.
10. Repeat the uniformity evaluation test as necessary to achieve an acceptable, uniform image.

Note: HELPFUL HINT—Your Kodak representative may be able to assist you through the uniformity testing process, and has the ability to obtain professional assistance from the CTS (Customer Technical Services) department of EI (Entertainment Imaging), in Rochester NY.

Projection and Telecine Uniformity Descriptions of Uniformity by Appearance

Periodic Non-Uniformity (repetitive)
Cross Streaks
<ul style="list-style-type: none">▪ Recognized by their repetitive nature▪ May exhibit a particular color record variation▪ May exhibit a gray-scale variation (lack of specific color)▪ May be narrow (less than full frame)▪ May be wide (equal to or more than full frame)▪ Usually recognized as a “flutter” or “flicker”
Random Non-Uniformity (non-repeating)
Mottle
<ul style="list-style-type: none">▪ A random, blotch-like variation▪ Usually exhibiting a specific color, or multiple colors▪ “Blotches” may appear as small and localized, or larger and more diffuse▪ Visual appearance is characterized by “within frame” color variations▪ Often described as a “boiling” or “churning” of density and/or color changes
Unevenness
<ul style="list-style-type: none">▪ A random or periodic variation▪ Often appears as a full-frame or larger non-uniformity▪ Unevenness may be caused by a long wavelength cross streak variation (long repeat interval)▪ Unevenness may be caused by an unusually large mottle pattern (multiple frame duration)▪ May consist of one or multiple color records▪ Entire projection screen or telecine frame is affected. Color of images appears to literally change from color to color as film is conveyed.
Streakiness
<ul style="list-style-type: none">▪ Streakiness may be exhibited as vertical or horizontal non-uniformity. (This may depend on film's format, i.e., 35mm versus 15-70 IMAX)▪ Can be recognized as a “curtain” or “rainy” appearance (16mm and 35mm format) or streaks appearing as a horizontal “sand storm” (15-70 format). Streakiness can be narrow (less than ¼ inch or 6.4 mm) on film.▪ Streakiness can be wide (more than ¼ inch or 6.4 mm) on film▪ It is important to note whether the streakiness can be described as a color variation or density variation. (This will assist in determination of the root cause of the non-uniformity.)▪ Are there multiple streaks within one frame area, or only 1-2 streaks? (This may also assist in a root cause determination.)

PROJECTION AND TELECINE UNIFORMITY SEVERITY DEFINITIONS

Severity Rating	Visual Perception	Coloration or Density	Image Behavior	Comments
10	Variations, cross streaks, flicker or streakiness are not identified, but some movement is present.	Individual color records may not be identified by observer.	Color or density variations are extremely minor, and the transitions are smooth.	Some very slight movement is observed, but is very acceptable. Movement will not interfere with customer use.
8	Variations, cross streaks, flicker or streakiness are not readily identified in the image, but differences of movement types are noticed.	Individual color identification is difficult. Specific color (red, green, blue) is very subtle and may not be identified by observer.	Color variations are present and are very smooth.	Movement is readily noticed by observer, but will not interfere with customer use.
6	Various types of non-uniformities are not easily identified, but can be distinguished by a trained observer.	Identification of specific color record(s) involved (red, green, blue) is possible.	Color variations are present and consistent, but are not quick and abrupt in their behavior. (Transitions from color to color or between densities are smooth.)	Movement is easily recognized in the image and may be objectionable to some critical customers or in some very critical applications (i.e., scene content, various film formats, etc.).
2	Individual types of non-uniformity are very evident in the image.	Very colorful density variations are exhibited. Color record identification is readily available.	Color variations are "turbulent" or abrupt in their behavior. Image density or color variations "overwhelm" the observer.	Movement in the image is very objectionable to the observer and is not acceptable for customer use.

